

ABSTRACT OF THE DISCLOSURE

In a distributed feedback type semiconductor layer diode including a semiconductor substrate, an optical guide layer
5 formed on the semiconductor substrate, a diffraction grating having a phase shift region being formed between the semiconductor substrate and the optical guide layer, and an active layer formed on the optical guide layer,

$$\kappa L + A \cdot \Delta \lambda \geq B$$

10 where κ is a coupling coefficient of the diffraction grating, L is a cavity length of the diode, $\Delta \lambda$ is a detuning amount denoted by $\Delta \lambda = \lambda_g - \lambda$ where λ_g is a gain peak wavelength of the diode and λ is an oscillation wavelength of the diode, A is a constant from
15 0.04nm^{-1} to 0.06nm^{-1} , and B is a constant from 3.0 to 5.0.